

NFTs. The upcoming revolution of ownership

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Abstract— The NFTs or Non-Fungible Tokens are currently taking the digital art and collectibles world by storm. Artists are seeing their lives change thanks to huge sales to a new crypto audience. Not only them, but also celebrities are joining as they spot a new opportunity to connect with fans. Digital art is not the only way to use NFTs. They can be used to represent ownership of any unique asset, from an item on a game to a house in the real world.[1]

Keywords—Blockchain, Cryptocurrency, Ownership, Tokenization, Smart contracts, Non-Fungible Token, Digital Assets.

I. WHAT IS AN NFT

NFT or Non-fungible token is an economic term that could be used to describe things like furniture, a song file, or computers. These things are not interchangeable for other items because they have unique properties. This technology in the blockchain world is a way to record, verify and track the ownership of a unique asset, either in the physical or the digital world. Works of art, contracts, music, books, real estate, and clothing are some examples of it. Any type of object that could be considered unique or rare could be an NFT, providing proof of authenticity and provenance, eliminating the problem of ownership, copyright, among others.[2]

II. HOW NFTS WORK

A. Creating an NFT

First, one must determine what unique digital asset they want to turn into an NFT. It is also imperative to own the intellectual property rights to the item wanted to turn into an NFT, to avoid legal obstacles.

Once the item to tokenize is decided, the next step is to choose the blockchain and the marketplace wanted to sell it.

Most common blockchains are Ethereum, Solana or Polygon, NFTs can be sold on custom marketplaces or on already-existing ones, such as OpenSea, Rarible, InmutableX...

After selecting the marketplace and the blockchain, The NFT creator must connect their wallet to them, making sure that they have enough funds to mint the NFT.

Minting an NFT is how a digital art becomes a part of the Ethereum blockchain—a public ledger that is unchangeable and tamper-proof. Similar to the way that metal coins are minted and added into circulation, NFTs are also tokens that get “minted” once they are created.

In order to mint the NFT one must provide the file. There are different strategies for setting the sale price, selling it at a fixed price or launch an auction.

B. Use cases

When is worth minting an NFT and what are its use cases?

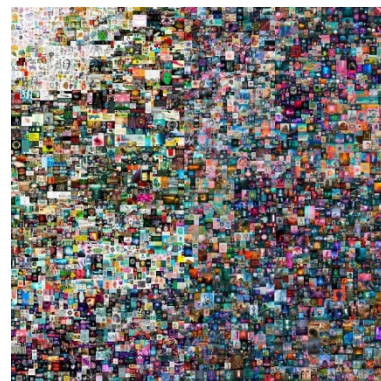
NFTs have to be given value. At the early stages of NFTs, some of them were just art. Now people are creating not only artistic NFTs, but with some utility linked to them. For example, if it is minted a house as an NFT or a group of them, the person who buys it, will be the legal owner of the house. Other examples include having limited-edition NFTs with serial numbers attached to them, or NFTs that act as a discount voucher in certain shops such as Nike. They can also be used to enter private groups in case it is owned an art piece.

C. Properties and benefits

NFTs not only have utility, but also inherent benefits. As the blockchain is a public database, everyone can see Who the owner is, therefore preventing fraud, as well as the entire history of ownership for a given NFT.

They also work as investment. NFTs have been rising since its creation on late 2017, having an exponential growth in 2021.

There are examples of NFTs minted with only 15 ETH and selling at 700 ETH. Another example are CryptoPunks that it was only needed to pay fees to get them (Approx. 5\$) now selling at a peak of 70 million dollars.



2.1 “everydays” from Mike Winkelmann



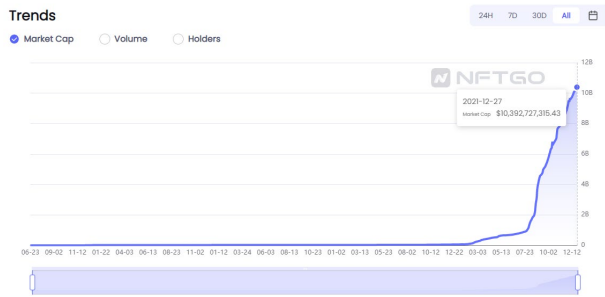
2.2 CryptoPunk #3100

III. RISE OF NFTS

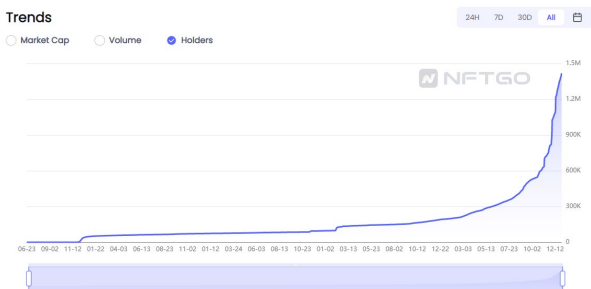
NFTs have grown incredibly since their inception in 2017 with the ERC-721 standard, a variety from ERC-20, the native standard of tokens in Ethereum blockchain, with 2021 being their best year. Here are some studies of NFTs.

A. Market growth

First, there is the market cap (or capitalization refers to the total value inside NFTs trades). As outlined below, NFTs had very low market cap, starting at around 100.000\$ at the end of 2017, 20 million dollars on 2018, 27 million dollars on 2019, 45 million on 2020 and after the boom on 2021 rising to more than 10000 million. [9]

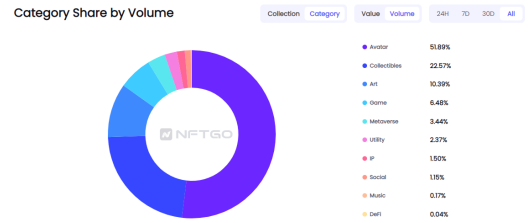


3.1 Market cap of NFTs on NFTGO



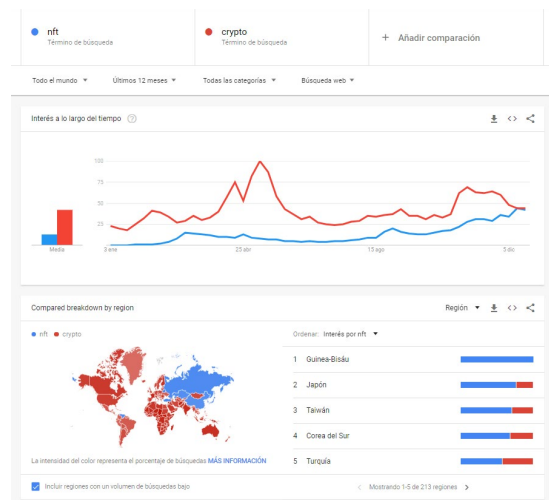
3.2 Holders of NFTs on NFTGO

Also, there is a graph of the most shared categories inside this marketplace to have an idea of what people are trading.



3.3 type of NFTs on NFTGO

as they were the first NFTs categories that got hugely popular. After 2021, their popularity increases and new concepts were born, as it is seen with games, metaverse, utility...



3.4 crypto and NFT searches on google trends

Comparing it with the term crypto in the last 12 months which involves the bull-run of 2021. In December NFTs surpass crypto in google searches.

Also, where are most searched those terms. Term crypto is searched across the whole world, including America, Europe, Africa, and Australia, but NFTs are more popular on Russia and Asia.

B. Brands collaborations

The rise of NFTs have also made brands and companies curious about them, and some brands joined this trend, including NFTs and metaverse as the most popular collaborations, contributing for the mass adoption of cryptocurrencies.

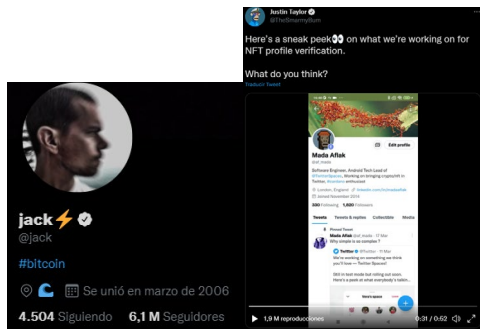
Here are some examples of brands and companies, with their activities in this market:

- Meta: As the world recently learned, Facebook company had a complete rebrand, with the name meta, letting the world know that their company will be focusing on the metaverse and NFTs from now.[12]



3.5 Facebook announced its new brand name

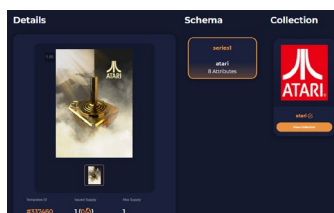
But it is also known Twitter is focusing on creating a decentralized social network, and that directives of Twitter are very excited about these new technologies. As an example, Jack Dorsey, ex-CEO of Twitter since Dec 2021, having #bitcoin on his biography. But not only that, it is known Twitter is working on integrating avatar NFTs as profile pics for users, and user verification also as an NFT [13].



Jack Dorsey's first tweet sold on Valubles by Cent to @sinaEstavi for \$2,915,835.47

3.6 Twitter and its CEO adopting NFTs

- Atari: The videogames Brand have not only launched them own NFTs in WAX blockchain, but their own token, videogames and lands on the metaverse [16].



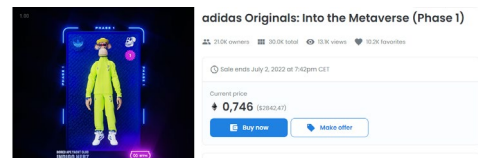
3.7 Atari NFT being sold in WAX marketplace

- Nike: The sports brand Nike, have recently bought RTFKT a studio of NFTs collectibles [17], for creating goodies as NFTs for the metaverse and they also created their own metaverse[18]. But not only that, around October they changed their brand information to add virtual goods [19].

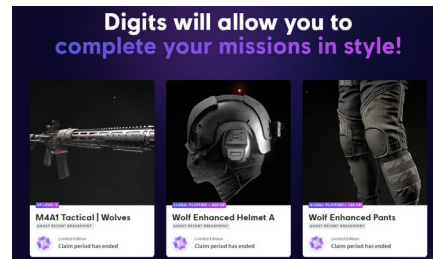


3.2 Updated trademark of Nike

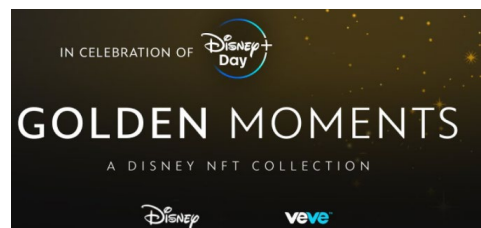
- Adidas: Recently acquired and partnered with some NFTs projects gmoney, PUNKS and Bored Ape Yacht Club. And launch its own public sale of 30.000 NFTs and finishing in less than 1 hour [20].



3.2 Adidas collection on OpenSea



3.2 NFTs on Ghost Recon game

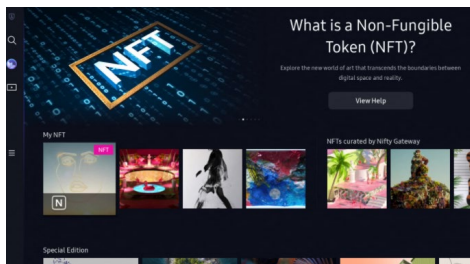


3.2 Disney announcing its NFT collection with VeVe

- Football teams: Many teams have joined the wave, launching their own token [24] or their collections and the biggest exchanges in the world are launching it, for example Binance with PSG, Santos FC... Also, many teams partnered with Sorare, a blockchain game of football to create NFTs of the players.

Another example are the NFTs of the teams, like FC Barcelona launching the bests moments of their history as NFT.[23]

- Samsung: In the presentation of the new TVs from Samsung they have announced they will contain an NFT platform to search, buy and sell them [26][27]. They are also interested on buying lands on the metaverse as it's CEO announced in 2021.



3.2 Samsung's NFT marketplace in new TVs

C. Virtual lands and metaverse

Virtual lands are one of the first concepts that connect NFTs with metaverse. Why?

It is simple, if there are houses being sold in the real world as NFT, the idea of owning a piece of land in a virtual world is not that crazy.

The concept of metaverse [28], word with the origin on “meta” and “universe”, was coined in 1992 in the science fiction novel Snow Crash by Neal Stephenson where humans as avatars interact with others and software agents in a three-dimensional world simulating the real one.

Also, on the famous book series Ready Player One and Ready Player Two by Ernest Cline, which involves a virtual world in a MMORPG (Massive Multiplayer Online Role-Playing Game) called “The OASIS” where people use to go to escape the real world in 2045 which is having a energy crisis and global warming.

Thanks to science fiction and expert, it is given a better definition for it. Metaverse is a network of 3D virtual worlds focused on social connection. In futurism and science fiction is described as hypothetical iteration of the internet as a single, universal virtual world that is facilitated using virtual and augmented reality headsets.

One of the first NFT projects and metaverse was Decentraland, a virtual world where it is possible to explore, create, and trade lands and virtual assets also known as NFTs. There are other projects like Bloktopia, a skyscraper of 21 floors, but this project is only an idea yet and is still being built, but that didn't stop a lot of brands and exchanges to join it to have a virtual space on the skyscraper.

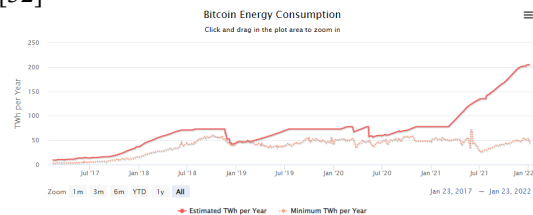
With the announcement of the company Facebook, changing its name to Meta, a lot of new projects and brands were interested on this concept which created an incredible excitement and income for the early projects and the new ones.

But the reality is that even if the metaverse is now in progress, it is in an early stage of the development, and not only that but an organization like web3 [29] is needed, that controls and create open standards for the web, so the control of the metaverse is on the users and not in companies, making the metaverse a monopoly.

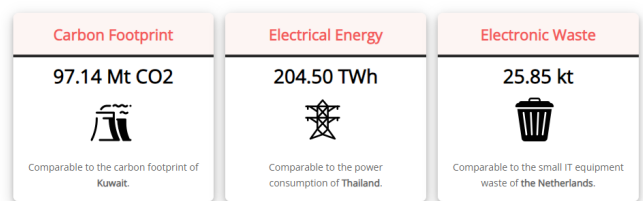
IV. ENVIRONMENT IMPACT ON DIFFERENT BLOCKCHAINS

It is said that cryptocurrency and NFTs are incredibly bad for the environment, but people usually repeat what they have heard without research.

Bitcoin, the first cryptocurrency, uses a proof-of-work consensus for its blockchain and transactions which means the miners compete between them to solve the problem faster than the others and that is the main reason of the energy cost. Bitcoin by itself generated around 38 million tons of CO2 which is more than the carbon print of Slovakia. [30][32]



Annualized Total Bitcoin Footprints



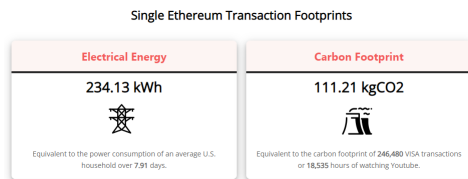
Miners realized that and in June 2021 the 56% of bitcoin mining were green.

Furthermore, bitcoin is known as the virtual gold because it works very similar to it. If it is done a comparison

versus gold mining, bitcoin is using less energy. Gold in 2020 according to some studies, of mining and refinement, uses 265 TWh of energy and 145Mt of CO₂. Bitcoin consumes around 50 and 70 TWh and around 50 Mt of CO₂ that is approximately a third part of the gold consumption and emissions.

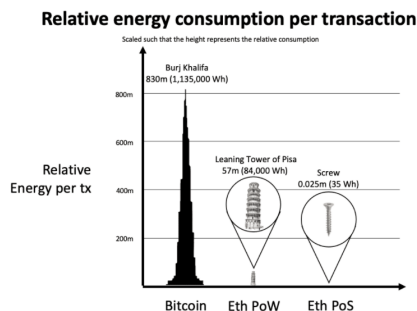
After talking about bitcoin, I would like to do it about Ethereum.

Ethereum uses the same protocol of consensus that bitcoin (PoW) and it also consuming a lot of energy. Ethereum is where the NFTs were born and that is why people usually says that NFTs are consuming a lot of energy. Right now, one Ethereum transaction is using around 200 kWh.[35][36]



4.2 Ethereum carbon footprint

The fact is that knowing the problem Ethereum is preparing its blockchain to change its protocol to proof-of-stake which will reduce the consumption in a 99.95%. That would make their transactions and of course minting the NFTs cheaper than putting a screw into a wall. It is planned for June 2022.



3.2 Energy consumption BTC, ETH, ETH 2.0

There are also more blockchains that have NFTs like Cardano, Solana, Binance smart chain... and they are fixing the problem that Ethereum have with different types of consensus. To give an example, 1 Cardano transaction is consuming 0.54 kWh which is comparable in year consumption scale to two power plants. Binance and Solana are even less than Cardano due to their centralized system.[37]

There are also some solutions for Ethereum right now that are the Layer 2 blockchains as Matic or Immutable X. A second layer is a secondary framework built on top of another blockchain, solving the speed and scalable difficulties that they face. That makes each transaction zero cost or almost zero.

Another fact to add is that Bitcoin, Ethereum and other currencies are looking to be greener, so they have less impact on the environment.[33][34]

V. GAMING

The gaming sector is one of the most powerful ones in all industries, generating more gross income than the music and movie industries combined. Recently, developers have started entering the world of the blockchain and, the NFTs are taking part of it.

The first generation of gaming on the blockchain came with games like Axie infinity or Plants versus Undeads. This kind of game is known as Play to Earn, because users receive tokens for playing it, having the possibility to sell them afterwards.

Axie infinity is very similar to a Pokemon game, running on the Ethereum blockchain, where there are creatures and users make them fight. Axie is only a battlefield for the creatures, but it is possible to raise new ones. The tokenomics (Is the science of the token economy. It covers all aspects involving a coin's creation, management, and sometimes removal from a network) system of Axie infinity is complex. But the basic premise is that users are required to have \$AXS tokens to buy the creatures (NFTs). Then when a game is won, the user receives another token \$SLP which can be sold.

Plants versus Undeads is another blockchain game, in this case running in the Binance Smart Chain which has less fees. This game was planned to be very similar to Plants versus Zombies, but they launched a farming mode before the real game. In this mode, the user was able to buy NFTs of plants with their token, \$PVU, and if the plants were watered, it was received Light energy that could be converted in \$PVU back again. This system has been proved to be unsustainable as even with periodic burns of the tokens to inflate the price everyone was selling it.

Those games were the beginning of gaming and NFTs together. Now there are similar games to them, but with cars, other creatures... But they lead into a revolution.

A triple A game is one that needs a big amount of money for development and marketing, which is supposed to return big incomes. Some examples are Call of Duty franchise or Fortnite.[38]

There are some AAA games being developed with a huge and experienced team backing it. For example, Big time, a MMORPG game with items as NFTs and an economy using its own token that will be led by users and players. Or Star Atlas which is using Unreal Engine 5 as a graphic motor, which is being used in new PlayStation 5 games, or games using the technology RTX, as an example.

Not only new games are being developed on the blockchain but some of them are using its technology. Ubisoft, a giant studio in gaming development have implemented Tezos blockchain to offer their users unique assets as NFTs, such as weapons or clothing.

Soon Ubisoft will not be the unique, but many other developers probably will join. EA is studying to add NFTs to FIFA 22, and Epic Games, has announced they welcome games on blockchain and NFTs on their store.[39][40]

NFTs will lead to a revolution for the gaming sector and the massive adoption of virtual currencies.

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